CLAIMS

We claim:

1. A storage stable insulin formulation comprising an aqueous solution of a fatty acid-acylated insulin containing at least about 0.2 to 0.7 mole of zinc per mole of said fatty acid-acylated insulin and having a pH of 6.8 to 7.8.

2. The formulation of claim 1 containing about 0.5 mg to 5 mg of a phenolic compound per milliliter of said aqueous solution

3. The formulation of claim 2 wherein the fatty acid-acylated insulin is N-acylated Lys^{B29} humin insulin.

4. The formulation of claim 3 wherein the fatty acid-acylated insulin is N-palmitoyl Lys^{B29} human insulin and the solution contains at least about 0.3 to 0.55 mole of zinc per mole of fatty acid-acylated insulin.

5. The formulation of claim 4 wherein the solution contains about 2.5 mg to 5.0 mg of said phenolic compound.

6. The formulation of claim 5 wherein the phenolic compound is selected from the group consisting of phenol, m-cresol, p-cresol, o-cresol, methylparaben, and mixtures thereof.

7. The formulation of claim 4 wherein the zinc is added to the solution as a water soluble zinc salt selected from the group consisting of zinc chloride and zinc acetate.

8. The formulation of claim 7 wherein the phenolic preservative is selected from the group consisting of phenol and m-cresol.

9. The formulation of claim 1 also containing a normal insulin.

10. The formulation of claim 1 also containing an insulin analog.

11. The formulation of claim 9 wherein the mole ratio of acylated insulin to normal insulin is in the range of 30:1 to 1:3.

12. The formulation of claim 10 wherein the mole ratio of acylated insulin to insulin analog is in the range of 30:1 to 1:3.

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13. A storage stable insulin formulation comprising an aqueous solution of a fatty acid-acylated insulin analog containing at least about 0.2 to 0.7 mole of zinc per mole of said fatty acid-acylated insulin and having a pH of 6.8 to 7.8.

14. The formulation of claim 13 containing about 0.5 mg to 5 mg of a phenolic compound per milliliter of said aqueous solution.

15. The formulation of claim 14 wherein the fatty acid-acylated insulin is B28-N^{ϵ}-acylated-$Lys^{B28}Pro^{B29}$-human insulin.

16. The formulation of claim 15 wherein the fatty acid-acylated insulin is B28-N^{ϵ}-palmitoyl-$Lys^{B28}Pro^{B29}$-human insulin and the solution contains at least about 0.3 to 0.55 mole of zinc per mole of fatty acid-acylated insulin.

17. The formulation of claim 16 wherein the solution contains about 2.5 mg to 5.0 mg of said phenolic compound.

18. The formulation of claim 17 wherein the phenolic compound is selected from the group consisting of phenol, m-cresol, p-cresol, o-cresol, methylparaben, and mixtures thereof.

19. The formulation of claim 16 wherein the zinc is added to the solution as a water soluble zinc salt selected from the group consisting of zinc chloride and zinc acetate.

20. The formulation of claim 19 wherein the phenolic preservative is selected from the group consisting of phenol and m-cresol.

21. The formulation of claim 16 also containing a normal insulin.

22. The formulation of claim 16 also containing an insulin analog.

23. The formulation of claim 21 wherein the mole ratio of acylated insulin analog to normal insulin is in the range of 30:1 to 1:3.

24. The formulation of claim 22 wherein the mole ratio of acylated insulin analog to insulin analog is in the range of 30:1 to 1:3.

25. A storage stable acylated insulin formulation comprising a lyophilized powder of said acylated insulin fortified with zinc in an amount of 0.2 to 0.7 mole zinc per mole of said acylated insulin.

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26. The formulation of claim 25 prepared by lyophilizing an aqueous solution of the acylated insulin containing a soluble zinc salt.

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